

Summary of Comments and Responses from NASA's Request for Information for "Implementation and Changes to Science Policy Document (SPD)-41: Science Information Policy"

December 8, 2022

2022 EXPLORE SCIENCE

SUMMARY OF COMMENTS AND RESPONSES FROM NASA'S REQUEST FOR INFORMATION FOR "IMPLEMENTATION AND CHANGES TO SCIENCE POLICY DOCUMENT (SPD)-41: SCIENCE INFORMATION POLICY"

Background

NASA's Science Mission Directorate (SMD) recognizes the need to maximize the openness of scientifically useful information produced by the research activities that SMD supports, while also ensuring the quality and preservation of that information. On 30 June 2021, NASA published SPD-41 "Scientific Information Policy for the Science Mission Directorate" based on existing Federal directives and existing NASA policies. On 19 November 2021, NASA issued a Request for Information (RFI) to solicit information from SMD communities on two aspects: 1) the potential impact of proposed updates to SPD-41 (provided as Appendix A to the RFI) on SMD-supported research and related activities and 2) what support, services, training, funding, or further guidance is needed to successfully implement the existing version and/or proposed updates for SPD-41. NASA issued an announcement on 10 January 2022 extending the RFI response date from 11 February 2022 to 4 March 2022 and conducted an SPD-41 RFI Town Hall on 26 January 2022. As indicated in the RFI, the responses helped inform SMD on how to update its minimum requirements for openness and accessibility of its scientific information in the updated policy, SPD-41a, as well as how to successfully implement the policy.

Disposition & Review Process

After the RFI closed, the 63 received responses were triaged based on whether they were directed to a specific SMD Division or to SMD overall. Each response was then reviewed by at least two SMD staff members; responses directed to a specific SMD Division were reviewed by at least one staff member of that Division. The Planetary Science Division (PSD) received 14 responses, the Astrophysics Division (APD) received 11 responses, the Heliophysics Division (HPD) received 4 responses, the Earth Science Division (ESD) received 3 responses, and the Biological and Physical Sciences Division (BPS) received 0 responses; 3 of the aforementioned responses were directed to multiple Divisions. The remaining 31 responses were directed generally to SMD.

Summary of Comments

The content of the 63 responses was triaged into over 300 specific comments that fell into three broad categories: 1) suggested changes to SPD-41a, 2) identification of areas of SPD-41a needing further guidance, and 3) ideas to support implementation of SPD-41a. Summaries of how SMD is addressing these three categories of responses are provided below; more detailed information is provided on the SPD-41 FAQ website and in the SMD Open Science Guidebook.

Overall, responses were supportive of the goals of SPD-41a and NASA's efforts to increase the openness and accessibility of its scientific information. The main concerns were with software requirements and how NASA would provide support and further guidance to the community for the implementation of SPD-41a.

Suggested Changes to SPD-41a

Over 100 suggested changes were reviewed individually for incorporation into <u>SPD-41a</u>. An overview of the implemented changes, as well as explanations for why some suggested changes were not implemented, are described below.

Overall Changes

To improve clarity, the overall structure of SPD-41a was reorganized and the reference documents (Appendix A) and definitions of key terms (Appendix B) were expanded. Notably, the term "scientific utility" was defined as information that is necessary to validate research findings or beneficial to future research activities. As this definition may still have different meanings to different science communities, each SMD Division will also provide further context specific to their communities as part of their individual Division-level information policies (see below). The document was also updated to ensure consistency of terminology throughout the text.

The applicability of SPD-41a (Section II) was further clarified, including under what circumstances the policy applies (Section II.E). The updated policy is forward looking, stating that existing SMD missions and research investigations should adopt the policy consistent with their resource availability. Any new mission that has not reached Key Decision Point B (for descriptions of Key Decision Points, see NASA/SP-2014-370) within three months of adoption of the policy are required to follow SPD-41a. New solicitations released after the adoption of the policy, beginning with the Research Opportunities in Space and Earth Sciences (ROSES) 2023 research announcement, are required to follow SPD-41a.

SPD-41a now provides suggested licenses for data (Section 3.C.vii) and software (Section 3.D.iii) produced from SMD funding. If there are no other restrictions, data should be released with a Creative Commons Zero license, as that allows for the broadest re-use of the data and is consistent with the OPEN Government Data Act, as part of the Foundations for Evidence Based Policymaking Act. If there are no other restrictions, software should be released with an open, permissive license (Appendix B now provides examples). When releasing software or data under these licenses, it is critical to ensure that there are no other restrictions on the open release of the software. If there is any question, seek specific advice from NASA's Chief Science Data Office, NASA's Office of General Counsel or Intellectual Property Counsel (or the appropriate Center Counsels), or your institution's cognizant authorities, as appropriate.

Further details on handling restricted information were provided throughout the document, highlighting when information is considered restricted and thus must not be shared. Restricted information includes any information exempted from SPD-41a due to Federal laws and/or NASA policies (Section II.C now provides an expanded list of examples). Clarifications on what is considered restricted mission software and the expectations for its sharing are now provided (Sections VI.D and IV.E; further details in Appendix F).

Further clarity was provided on the implications to partnership including partial partnerships where NASA is the lead and what meets the definition of "partner-led." Expectations were included in the policy on both the participation in NASA-led missions as well as expectations for when NASA is participating in partner-led missions.

Expectations related to sharing software, including software licensing, were clarified throughout the document. Maintaining scientific software is now explicitly not required by SPD-41a (Sections VII.C.iv and VII.D.iii). Scientific software developed under a commercial language is expected to be released, if permitted under the license for the language. Software developed as part of previous work that is not currently openly available should be released as open source software if enhancements were made to it as part of SMD-funded work under solicitations to which SPD-41a is applicable and if the software is used in support of a scientific, peer-reviewed publication (Section VII.C.ii; note that "should" denotes a good practice that is recommended, but not required, as defined in Section II.H).

Section VIII was added and contains significantly updated language from the previous version of the policy to clarify requirements associated with SMD-funded scientific events. Only publications that are produced as part of a public, scientific event for which SMD is the primary sponsor must be shared. This may include the public proceedings and presentations made at the event, but does not include preliminary information (including analysis, communications with colleagues, data, or software).

The most common reason that a proposed change to SPD-41a was not implemented was due to conflict with current Federal law and/or NASA policy. This included requests for certain NASA policies to not apply to missions, conflicts with current federal requirements on data, or limiting the type of software NASA can use. Other proposed changes were only applicable to a single SMD Division and are thus instead addressed in the Division-level policies (see below), where appropriate. Some proposed changes were not implemented due to being out of scope of SPD-41a and are noted for future revisions of this policy. Examples of these proposed changes include requirements around hardware, user accounts, software curation, dynamic documents, data availability statements, and Open Access publications.

Many RFI responses raised concerns related to the requirements on openly releasing scientific software. These concerns included what types of software must be released, the timing of the release, and the level of documentation and maintenance expected to be provided. The availability of scientific software is crucial for the reproducibility of research, as publications often do not capture all of the needed information. Starting in 2019, SMD made the sharing of scientific software a recommended best practice in solicitations following the recommendations in the Open Source Software Policy Options for NASA Earth and Space Sciences report by the National Academies of Science, Engineering and Medicine (NASEM). To meet the expectations in the NASEM report for NASA to transition to openness and ensure reproducibility of its funded research, SPD-41a requires the sharing of unrestricted scientific software developed with SMD-funding for new grants starting in ROSES-23 at the time of the publication or at the end of the grant. To minimize the burden on the community, SPD-41a places no requirements on maintaining the software (Sections VII.C.iv and VII.D.iii) or the quality of the software. Researchers are instead encouraged to meet the best practices in their relevant open source or

scientific communities (Section III.D.ii), which in many cases would include providing documentation and tests along with the software upon release.

Areas Needing Further Guidance

The RFI responses included nearly 100 areas identified as needing further guidance from SMD, and typically requested clarification regarding the scope and applicability of SPD-41a as well as what constitutes sufficient compliance with it. Software was the primary area of concern. SMD is addressing these areas with the following activities:

- a) SMD has developed Open-Source Science Guidance that provides further information for the community on the general implementation of SPD-41a. The first version of this guidance is currently provided on the <u>Scientific Information Policy website</u>. SMD will continue to develop this guidance, and this information will also be shared on GitHub to facilitate development of resources over time, provide transparency in the development process, and allow for community input.
- b) Each SMD Division is developing or updating their Division-level information policies to provide any further guidance needed for their community. These Division-level information policies will be released before ROSES-2023.
- c) SMD is developing a common language for ROSES and Announcement of Opportunity solicitations to provide further clarity on minimum requirements and expectations.
- d) An extensive <u>SPD-41a FAQ</u> is now part of NASA's <u>Scientific Information Policy</u> website.
- e) Training for the SMD community on topics related to SPD-41a implementation is being incorporated into the SMD <u>Transform to Open Science</u> (TOPS) project.

Ideas to Support Implementation

The responses included roughly 100 ideas to support implementation of SPD-41a, which were broadly divided between establishing/promoting standards (e.g., for metadata, peer review of data/software, metrics for tracking success) and providing resources (e.g., funding, training, infrastructure). SMD is addressing these with the following initiatives:

- a) Support: Proposers should request the appropriate levels of funding and work effort, as well as the appropriate period of performance, needed to comply with SPD-41a requirements.
- b) <u>Transform to Open Science</u> (TOPS): training for developing open science skills (general and field specific), such as for producing quality code and curated datasets.
- c) SMD Core Services: infrastructure and other resources for supporting and enabling open science, such as an SMD-wide data repository and search capabilities. This includes the in development Science Discovery Engine that provides cross-divisional data search and expansion of the Astrophysical Data Service to all of the SMD divisions.
- d) Open Science Guidelines: to promote existing open science practices, provide guidance on how to implement, to promote standards and develop new standards where needed, and to solicit community contributions and feedback.

- e) ROSES Cross-Divisional Research: ROSES program elements (e.g. <u>ROSES22 F.8</u> Supplement for Open Source Software, <u>ROSES22 F.14 High Priority Open Science</u>) that provide funding for open science efforts, including developing and implementing community training, and open source software.
- f) Division-level Information Policies: providing community-specific templates (e.g., for Data Management Plans), examples of acceptable compliance standards, and more nuanced definitions of key terms for each SMD Division.
- g) SMD Working Groups: Open Science Guidelines (e.g., for defining compliance, peer review practices for data and software, metrics for tracking success), SMD Artificial
 Intelligence Initiative (e.g., for developing benchmark training datasets for each of the SMD Divisions).

SMD will explore further ways to support the implementation of the policy and continue to advertise additional opportunities for the community to contribute to the process including in workshops, studies, and other events.

Additional Responses from SMD Divisions

PSD: The RFI responses directed to the Planetary Science Division (PSD) were largely concerned with new requirements for making software openly available, particularly what would be considered compliant implementation, the expectations for maintenance and community contributions, and the potential for uneven impact across the community. Additionally, the RFI responses requested guidance on the requirements for sample materials. The PSD information policy provides further guidance on these and other areas, for both proposers and reviewers.

APD: RFI responses directed to the Astrophysics Division (APD) were extremely helpful and often made specific, actionable suggestions. The responses reflected strong support for open science principles. Implementation/practicalities of open software (including maintenance and validation of code), the costs associated with meeting SPD-41a requirements, and burdens on data repositories were the focus of many responses. Specificity was sought on the sharing of information generated at SMD-sponsored meetings and some concerns were raised regarding potential negative impacts on early-career and under-resourced astrophysicists. All of these issues have been addressed by changes to SPD-41a and the Astrophysics Science Information Policy provides further guidance as required. The latter includes guidance on what the Division views as 'scientifically useful' and a mechanism for obtaining clarification in specific cases. In addition, respondents asked for guidance on compliance, metrics, and training all of which is being developed. APD is committed to minimizing compliance burden and to enable making scientifically useful, high-quality, information publicly available as soon as practical.

ESD: RFI responses directed to the Earth Science Division (ESD) were focused around questions of software utility, mission readiness to fully implement the policy, partnerships, and concerns on funding in proposals to support the initiatives, definitions, and how compliance would be monitored. There were requests for more clarity on definitions of "peer-reviewed," "algorithms," and "information" as well as more rigidly defining guidance that included phrases such as, "to some degree" and "exceptions including but not limited to." RFI responses included encouraging more definition around the embargo and no-delay periods for data release. Sections regarding

software release and best practices received comments focused on defining what would constitute a contribution, what would be an acceptable repository and who would determine that, as well as whether the software release portion of the policy would apply only when code has been completed and validated or if the intent was for full lifecycle development in the open. There was concern regarding whether that would vary for missions versus SMD-funded research. Sufficient clarity has been included in the policy. ESD is committed to minimizing the compliance burden on our user communities and to adopting this policy guidance.

ESD RFI responses also asked questions about the sharing of NASA-purchased data, and some of this is covered by the agreements we have with commercial partners through the Commercial Smallsat Data Acquisition (CSDA) program, but not all. There was also a request for the creation of training regarding the new best practices for release of data, software, and publications under the implementation of SPD-41a. Practical examples of "Single Use Software" revealed gaps and discrepancies in common understanding such that resulting clarifications were necessary and are reflected in the updated policy. Finally, there was a concern regarding the cost implications via the requirement for all SMD-led missions that had not yet passed KDP-C, and this was also raised to the SMD-level for decision and the requirement was relaxed to apply for missions that had not yet passed KDP-B.

HPD: RFI Responses to the Heliophysics Division (HPD) were focused on improving support for archiving models and simulation data, concerns with software development, and impact to the community and individual contributors' careers associated with open science. Models and simulations produce large quantities of data and the RFI responses were concerned with resources to ensure community-wide access. For software, the RFI responses pointed to concerns between SPD-41a and NASA-wide policies regarding civilian contributions to open-source software projects and sufficient resources to smaller institutions to support software. For additional support and information to SPD-41a, the HPD data policy provides further guidance on open science policy in HPD.

BPS: The Biological and Physical Sciences Division (BPS) largely funds experimental science as opposed to observational science. The BPS information policy therefore does not include policies for "mission" data and all BPS data is considered "research" data, as defined in SPD-41a. The BPS information policy makes a distinction within "research" data for "operational" data to specify that these data must be supplied to the BPS Open Science Data Repository (OSDR). BPS requires all BPS-funded research data be delivered to a designated OSDR to ensure efficient data management compliant with FAIR principles. Researchers are free to deposit data to additional sites, if desired.

Summary and Next Steps

The 63 responses to the RFI helped SMD to update and clarify the policy, provide direction for where further guidance was needed, and ideas for implementation. SMD will continue to develop guidance in consultation with the community on the open science policy. A number of initiatives have already begun under the Open Source Science Initiative and each of the SMD divisions to help support the implementation of the policy, and further steps will be taken

following the suggestions in the responses to further support the community. Question and further feedback can be provided to HQ-SMD-SPD41@list.nasa.gov.

Appendix A. Request for Information on Implementation and Changes to Science Policy Document (SPD)-41: Science Information Policy

NOTICE: Amended January 10, 2022. The Response Date has been deferred to March 4, 2022.

Solicitation Number: NNH22ZDA006L Release Date: November 19, 2021

Response Date: February 11 March 4, 2022

This Science Mission Directorate Request for Information (RFI) does not constitute a commitment, implied or otherwise, that the National Aeronautics and Space Administration (NASA) will take action in this matter. Responses to this RFI are sought broadly from "interested parties", e.g., U.S. industry, universities, non-profit organizations, NASA centers, and other U.S. government agencies, and will be used by NASA to further inform program planning and SMD's overall acquisition and assistance awards strategy development.

1. Summary

The NASA Science Mission Directorate (SMD) requests information about changes and implementation of the SMD Policy Document SPD-41: The Scientific Information Policy. As part of the NASA Plan for Increasing Access to the Results of Scientific Research and the Strategy for Data and Computing for Groundbreaking Science 2019-2024, SMD recognizes the need to maximize the openness of scientifically-useful information that is produced as part of our research activities while assuring the quality and preservation of that information. As the diverse SMD community has a wide breadth of needs and the policy may have different impacts on that community, SMD is requesting information on two aspects of SPD-41.

Aspect One: SMD is requesting information about how the proposed changes (included in Appendix A of the RFI) to the existing SPD-41 may impact the research and related activities of different SMD communities. While these changes or additions to SPD-41 are created based on Federal guidance, NASA policy, National Academy studies, or community best practices, SMD strives to minimize the burden on our community in the implementation of these policies. Therefore, SMD requests help to identify areas that will be particularly affected by SPD-41.

Aspect Two: SMD is requesting information about what support, services, training, funding, or further guidance is needed to support the successful implementation of the existing or proposed information policy. This could include specific training that will be necessary for your community, technologies or services that have been particularly helpful in sharing research information, or mechanisms that are needed to be developed to fully support the policy.

This information will be used to help inform SMD and each of the scientific divisions about how best to implement the policy and to maximize openness for the information generated from SMD supported research.

The SMD information policy applies to all scientific divisions within SMD. The policy sets the expectation for openness across the directorate so there is a uniform minimum requirement for the information that is produced from SMD funding. All SMD scientific divisions are developing new policies to provide further guidance or reviewing current policies to ensure they align with SPD-41.

2. Background

The information produced as part of NASA's scientific research activities represents a significant public investment. NASA holds this information as a public trust to increase knowledge and serve the public good. This information includes publications, data, and software created in the pursuit of scientific knowledge. Results of federally funded research and development need to be shared openly to maximize the benefit and reach of the information. Data need not only to be archived but also to be curated – that is, the data are assured to have continued accessibility and usability for multiple decades. The availability of software enhances the discoverability, accessibility, sustainability, and reproducibility of NASA science while maximizing the benefit of NASA to society.

It is SMD policy, consistent with NASA and Federal policy, that information produced from SMD-funded scientific research activities be made publicly available.

The Science Mission Directorate plans to expand the existing scientific information policy, SPD41, to increase the accessibility of scientific information that is produced from NASA SMD funding. The current information policy is a consolidation of existing requirements related to NASA SMD research information. The changes being proposed here are based on existing Federal directives and NASA policy as well as National Academy Studies, community best practices, and community-led studies. The policy continues the goals of the NASA Plan for Increasing Access to the Results of Scientific Research and is based on the recommendation from the Strategy for Data and Computing for Groundbreaking Science 2019-2024.

The proposed updated information policy, SPD-41a, is provided at this link. A change log of the proposed changes is provided in Appendix A at the end of the RFI. The SPD-41a draft includes a full set of references and supporting material including definitions. In addition, a document with further guidance is also provided on the Scientific Information Policy website.

3. Definitions

A full list of definitions is provided as part of the DRAFT updated policy. For convenience, we provide a subset of the most relevant definitions here:

- 1. Information: Scientific knowledge produced as part of a research activity. This can include, but is not limited to, publications, data, and software.
- 2. Publications: Scientific and technical documents released through print, electronic, or alternative media.
 - i. This includes peer reviewed manuscripts, technical reports, conference materials, and books.
 - ii. This does not include laboratory notebooks, preliminary analyses, drafts of scientific papers or preprints, plans for future research, peer review reports, or communications with colleagues.
- 3. Data: information that can be stored digitally and accessed electronically.
- iii. Information produced by missions include observations, calibrations,

coefficients, documentation, algorithms, and any ancillary information iv. Information needed to validate the scientific conclusions of peer-reviewed publications. This includes data underlying figures, maps, and tables.

- v. This does not include laboratory notebooks, preliminary analyses, drafts of scientific papers, plans for future research, peer review reports, communications with colleagues, or physical objects, such as laboratory specimens.
- d. Software: computer programs in both source and object code that provide users some degree of scientific utility or produce a scientific result or service.

4. Requested Response Topics

Interested parties, e.g., U.S. industry, universities, non-profit organizations, NASA centers, other U.S. government agencies, and individual researchers, are requested to respond to this RFI by submitting a PDF through NSPIRES following the instructions below. The response text shall not exceed 5 pages (including attachments) and shall use a minimum font size of 12 point. Interested parties may submit multiple responses but each response must be to a unique aspect of requested information.

Your response should include name, contact information, and indicate whether a U.S. entity; identify co-authors, if any, to the response; identify relevant SMD divisions; and your response to the RFI. An example template is available in Appendix B within the release of this RFI.

Any public discussion of the results of this RFI will not disclose the identities of the respondents, but parts of or the full response may be made publicly available.

DISCLAIMER

Since this is a request for information, no evaluation letters and/or results will be issued to the respondents.

It is emphasized that this RFI is NOT a Request for Proposal, nor is it an Invitation for Bid. This RFI is being used to obtain information for planning purposes only, and the Government does not intend to award a contract at this time. As stipulated in FAR 15.201(e), responses to this notice are not considered offers and cannot be accepted by the Government to form a binding contract. Pursuant to FAR 52.215-3, entitled Request for Information or Solicitation for Planning Purposes, this information is being made available for market research, information, and planning purposes and to allow the broader community the opportunity to verify reasonableness and feasibility of the requirement, as well as promote competition. This RFI is subject to review or cancellation at any time and is not to be construed as a commitment by the Government to enter into a contract. The Government will not pay for the information submitted in response to this request.

Please do not request a copy of the solicitation, as no solicitation exists at this time. If a firm requirement is developed and a solicitation is issued, the solicitation will be made available through NSPIRES (https://nspires.nasaprs.com/external/). It is the responsibility of Offerors and interested parties to monitor the internet sites for the release of the solicitation and amendments, if any, and they will be responsible for downloading their own copy of the documents. NASA Clause 1852.215-84, Ombudsman, is applicable. The Center Ombudsman for potential acquisitions can be found at

https://www.hq.nasa.gov/office/procurement/regs/ProcurementOmbuds-Comp-Advocate-Listing.pdf.

5. Requested Information

Respondents may not submit confidential information, Controlled Unclassified Information (CUI), proprietary information, or export-controlled information, including International Traffic in Arms Regulations (ITAR) and the Export Administration Regulations (EAR) restricted information, in response to this RFI.

The response must contain the following information:

Name of submitter and contact information (institutional affiliation, E-mail address, USentity). Name and contact information for all Co-authors on the RFI response.

SMD division(s), office, or branches that the response is relevant to.

[OPTION 1] Response to the question on impact of the proposed changes or additions to SPD-41.

[OPTION 2] Response to the question on implementation of SPD-41.

6. Response Instructions

All responses must be received by 11:59 p.m. Eastern time on February 11 March 4, 2022.

All responses to this RFI must be submitted in an electronic format via the NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES), located at http://nspires.nasaprs.com/. Appendix B provides an optional or suggested response template.

For this RFI, a response submission will take the form of a Notice of Intent (NOI) within the NSPIRES online announcement data management system. The RFI response itself will be a PDF-formatted document that is attached (uploaded) to the NSPIRES system. All responses must adhere to the following formatting requirements:

Length: Page size: Paragraph:

Margins: Font:

Inserts:

5 pages

8.5" x 11.0" paper size

Single-spaced, single-column text with no more than 5.5 lines per vertical inch of text One-inch margins on all four sides with no content in the margins Font size 12, not to exceed 15 characters per horizontal inch, including spaces, sans serif font recommended.

Figures, tables, and other inserts are permitted

You must be registered with NSPIRES to submit a RFI response. See registration instructions at http://nspires.nasaprs.com/ (select "Create an account"). Neither institution registration nor an institution affiliation is required to respond to this RFI.

- 1. When you have an NSPIRES account, go to the NSPIRES page for "Request for Information: Implementation and Changes to Science Policy Document (SPD)-41: Science Information Policy" Number: NNH22ZDA006L.
- 2. Click "Create"
- 3. Log in when requested
- 4. Enter the Request for Information: Response title NOTE: NSPIRES will show this as

"NOI title"

- 5. Select "do not link at this time" for submitting organization page.
- 6. Click "Save" on next page.
- 7. It is not necessary to complete any of the "NOI Details"; all requested information should

be included in the attached PDF document. Information which is entered into "NOI

Details" but not included in the attached PDF document will not be considered

8. Prepare your RFI response offline and save as a PDF document (NSPIRES instructions

on PDF formats are described in the NSPIRES PDF Guidelines available at http://nspires.nasaprs.com/tutorials/PDF_Guidelines.pdf). The response document must include the respondent's Name, institution, and e-mail address so the file is self contained. File names format should be "PI Last Name - First Name - Number - RFI". "Number" will be used to distinguish multiple responses from the same PI. The response should not exceed 5 pages in length excluding references.

- 9. To attach (upload) your PDF document:
 - 1. a.) Click "add" under NOI attachments section.
 - 2. b.) Select "Proposal Document" from the drop-down list.
 - 3. c.) Browse to attach your PDF file.
 - 4. d.) Select "Upload".
 - 5. e.) Click "OK".
 - 6. f.) Your RFI document has been uploaded to NSPIRES.
- 10. Click Submit NOI button. NOTE: Clicking "Submit NOI" does not complete the submission process.
- 11. Ignore any warnings about incomplete NOI elements
- 12. Click "Submit". This will take you to the NOI submission confirmation page, which provides you with the NOI/RFI number for your records.

Please note: You may delete and replace form fields and uploaded documents any time before the submission deadline, however once your RFI is submitted, it cannot be deleted. Unsubmitted responses will not be considered.

6. Point of Contact

Please email questions and comments concerning this RFI to HQ-SMD-SPD41@mail.nasa.gov no later than March 2, 2022 at 11:59 Eastern time, with the subject line: "NASA SPD-41 RFI Question/Clarification". Depending on the nature of received questions, NASA may respond on an individual basis by email or may post responses to inquiries in a "Questions and Answers" document available at https://go.nasa.gov/RFISPD41. Any posted Q&A will be edited to preserve the anonymity of persons and institutions who submit questions and are intended to address inquiries of broader interest and general clarification.

Steven M. Crawford, PhD Science Data Officer Science Mission Directorate

Mary W. Jackson NASA HQ Building Pronouns: he/him/his HQ-SMD-SPD41@mail.nasa.gov

The preceding email may not be used to submit RFI responses; any submissions made via this email address will not be considered.

Appendix A: Proposed Changes to SPD-41

- 2. Changes to Section III General Policies, Part B relating to Data:
 - 1. SMD-funded data should follow the FAIR Guiding Principles for scientific data

management and stewardship. This means data should be findable, accessible, interoperable, and reusable (FAIR).

- 2. SMD-funded data shall be made available in convenient¹, modifiable, and open formats.
- 3. SMD-funded data shall be findable such that the data can be retrieved, downloaded.

indexed, and searched.

4. SMD-funded data shall include robust, standards-compliant metadata that clearly and

explicitly describe the data.

- 5. SMD-funded data shall be reusable with a clear, open, and accessible data license.²³
- 6. SMD-funded data collections shall be citable using a persistent identifier, and SMD

should encourage that data users to cite the sources of the information used to conduct peer-reviewed, published research.

- 3. Changes to Section III General Policies, Part C relating to software:
 - 1. When released, SMD-funded software should follow best practices in the relevant open source and research communities.
 - 2. SMD-funded software shall be released under a permissive license that has broad acceptance in the community.
 - 3. SMD-funded software projects shall include a code of conduct and guidelines for how to make contributions.
 - 4. SMD-funded software shall be made available in a publicly accessible repository that is widely recognized by the community.
 - 5. SMD-funded software shall be citable using a persistent identifier, and SMD should encourage that users to cite the software if used to conduct peer-reviewed, published research.³
- D. Change related to Section III General Policies, Part G relating to Data Management Plans: a. Variances for DMP plans are moved from the selection officer to the data officer
- E. Additions to Section III: General Policies
 - 1. All SMD-funded activities shall include a software management plan describing the

management and release of software to facilitate the implementation of these information policies.

- 2. SMD shall require that all investigators supported by SMD funding have a persistent identifier such as ORCID.
- 3. SMD shall provide a persistent identifier for all funding mechanisms and missions.
- 4. SMD shall provide information for how best to meet these policies. Where possible,

SMD should provide additional information and tools to support meeting these policies.

- e. Information shall be archived in repositories that are capable of maintaining the information for a period of at least 25 years.
- F. Additions to Section IV: Additional Policies for Missions
- a. Mission software shall be developed openly in a publicly accessible, version controlled platform that allows for contributions and engagement from the community.
- G. Additions to Section V: Additional Policies for Research
 - At the end of a research award, scientifically useful data associated with the award that has not already been made public shall be made publicly available.

 Extensions, variances, and exceptions of up to one year may be requested from the program officer. Any period longer than one year will follow the process in Section VII Variances.
 - 2. In order to achieve reproducibility, research software developed using NASA SMD funding and used in support of a scientific, peer-reviewed publication shall be released as open source software no later than the publication date.
 - i. This does not include commercial software.
 - ii. Software that was developed as part of a previous work is only required to be included if enhancements were made as part of the SMD-funded work.
 - 3. At the end of a research award, scientifically useful software developed or enhanced

¹ Convenient means the data are accessible without requiring proprietary software.

² Government works are by default in the U.S. public domain and should be used if no other license applies. ³ Open Source software policy options for Earth and Space Science

as part of the award shall be released as open source software.

- i. Extensions, variances, and exceptions of up to one year may be requested from the program officer. Any period longer than one year will follow the process in Section VII Variances.
 - 4. During SMD reviews, peer reviewed data and software shall be recognized as having the commensurate value as peer reviewed manuscripts.
 - Lack of compliance with this policy by SMD-funded Principal Investigators will
 reduce the likelihood of selection of future proposals submitted to SMD programs by
 that individual as Principal Investigator.
- H. Additions to Section VI: Additional Policies for other SMD-funded Activities
- a. The policy will apply to conferences, workshops, and symposia in the following way:
 - i. Conferences, workshops, and symposia for which SMD is the primary sponsor shall follow this policy and make any information produced during the conference publicly accessible. Publications, presentations, data, software, media, or other materials produced as part of the conference shall be deposited in the appropriate NASA repository.
 - ii. Participants sponsored to attend conferences, workshops, and symposia with SMD funding shall deposit their contributions in the appropriate NASA repository.
- iii. Conference, workshops, or symposia for which SMD is not the primary sponsor shall be encouraged to adopt this policy for the information produced as part of the event.

I. Changes to Section VII: Variances

- 1. The SMD Associate Administrator (AA) is the final authority on this policy and shall determine the reasonableness of any variances to it.
 - i. The SMD Data Officer shall have authority to grant any variances to this policy.
 - ii. Requests for variances to the policy may be submitted by the program or project manager, or by the SMD program scientists or program officer, shall receive concurrence from the SMD division director, and approval from the SMD Data Officer.
 - iii. Appeals to the decision of the SMD Data Officer may be submitted to the SMD AA, who has final approval authority for variances or deviations with dissent.

- iv. Each of these named individuals (program or project manager, SMD program scientist or program officer, SMD division director, SMD data officer, SMD AA) may delegate their responsibility as needed.
- v. Variances may be requested for an entire program or for an individual project.
- 2. If available, the recommendations of any peer review panels will be considered as part of assessing the reasonableness of a variance.
- J. Changes to Section VIII: Measurement and Verification
 - 1. SMD will collect a variety of metrics intended to measure or assess the efficacy of its

data systems and services to assess user satisfaction. Consistent with applicable laws, SMD will make those metrics available for review and will conduct independent reviews on SMD compliance with this policy at least once every five years.

2. The policy will be reviewed at least once every five years.

K. Added Appendix D. Guidelines for a repository L. Added Appendix E. Levels of Mission Data

Document:

Appendix B: Suggested Response Template – Text Document

TITLE of RESPONSE

Response to RFI: Implementation and Changes to Science Policy Document (SPD)-41: Science Information Policy

Primary Author Name, Contact Information Additional partners/Co-authors, including contact information

Brief Summary (2-3 sentences) <insert text here>

Title/Question/Topic/Response <insert text here>

NOTE: This template is a suggestion. Respondents should feel free to utilize visual elements (borders, colors, figures, etc.) to communicate their response.

NOTE: All submissions to NSPIRES must be in PDF format. Be sure to review your submission in PDF format for any conversion errors before uploading to NSPIRES.

References (does not count towards 5-page limit)